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ENTOMOLOGICAL NEWS

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Two Notes on Corduliine Nymphs (Odonata: Libellulidae)

By ERICH SCHMIDT, Bonn (Rhine), Mozartstr. 22

1. NYMPHAL DIFFERENTIATION IN THE EUROPEAN *Somatochlora arctica* AND *alpestris*

At the end of June, 1935, the writer visited the Black Forest for collecting dragonflies and their nymphal skins. After a stay at Hinterzarten, in the environs of which some imagoes of *Somatochlora* were taken, he stopped also on the bog of Feldsee (1,111 m.), where besides these an Aeschnid imago, which from its extended blue coloration was at first believed to be an *Anax* male, was seen but escaped. Surely, this was the first specimen of *Aeschna coerulea* which I saw flying. Afterward, the bog (ca. 1,100 m.) near Spiesshorn was visited, and there additional imagoes of *Aeschna coerulea* were seen flying and were, in part, secured. The two boreo-alpine *Somatochlora* were more plentiful here, especially their nymphal skins; and those of *Leucorrhinia dubia* were even more common. Not before June 24, 1939, upon returning from a trip to southern Italy and Greece, did I touch the latter place near Spiesshorn again and spend there a most pleasant day, cloudy but without rain. Probably many preceding days had been sunny ones for I succeeded in collecting nearly 300 exuviae during 9 hours of this day in a boggy area of not more than 15 acres that contained several spots of open water. The absence of the reflection of sunlight from the water favored the finding of these exuviae. A third visit at nearly the same season in 1944 was a complete failure since only some scarce skins of *Leucorrhinia dubia* were

seen. Altogether, more than 150 exuviae of the two *Somatochlora* species were taken without the corresponding imagoes and, without doubt, needed identification.

It was easy, however, to find exuviae of *Somatochlora arctica* together with the newly emerged imago at Spiesshorn bog, where I mostly arrived at nearly the same season as Dr. F. RIS in Cierfs, Switzerland, who there discovered the two hitherto unknown nymphs of both *S. alpestris* and *S. arctica.* At the times of my arrivals at Spiesshorn bog *S. alpestris* was always fully developed as RIS also stated it was in Cierfs; but fortunately I succeeded in finding a male nymphal skin of the latter together with its imago on 26.VI.33 at Teufelskreise near Schneekopf (978 m.), Forest of Thuringia, and the exuviae found on 13.VII.41 at Maurizi bog near Gottesgab (1,028 m.), Erzgebirge, under the leadership of A. SCHÖTTNER, surely also belonged to *S. alpestris,* since *S. arctica* was missing there.

RIS was the first to describe these nymphs (1911, pp. 25–28, 32–34) and published a key to all Middle-European Corduliine nymphs. This key was completed for all Europe by VALLE (1931, p. 50), who described the nymph of the holarctic *Somatochlora Sahlbergi* from Fennish Petsamo, and by GRASSÉ (1930, pp. 9–14) with his description of the nymph of *Macromia splendens* from S. France. The key of MAY (1933, pp. 107–109) in *Somatochlora* is a mere copy of that of RIS (1911). FRASER (1949, p. 55) gave a key to the nymphs of the British species, in which he preferred other characters for both species than RIS, which, however, were also included in RIS' descriptions. Both RIS and FRASER had only a few exuviae of the two species at hand so that they were unable to appreciate the variation that exists in some characters. Perhaps E. M. WALKER (1925, pp. 40, 42) knew of this when he remarked that the "typical *S. arctica* of northern Europe and Asia . . . differs very much less in form and coloration from *S. alpestris* than the American representatives of these two groups differ respectively from each other."

My own attempts at identifying the exuviae were at first not at all satisfactory and I was anxious to find a certain and

constant character for separating them. Beginning with the nymphal skins identified by the nearby newly emerged imago, I believed that the distribution of long hairs on the abdominal

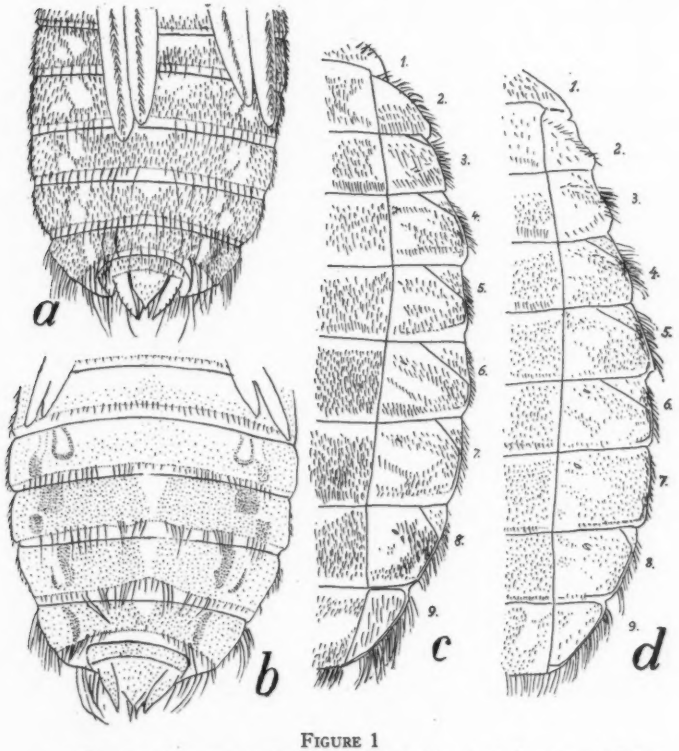

FIGURE 1

a, c *Somatochlora arctica* Zett. ♂ nymphal skin; b. d *S. alpestris* Selys ♂ nymphal skin, all from the bog near Spiesshorn, Black Forest, 24.VI.39. a, b abdominal segments 5–10, dorsal view; c, d left side of abdomen, ventral view; no. 1–9 are the segments.

surface might be the fundamental character that RIS suggested when he supposed that the nymphs of the two species appear to be different "prima vista." But this character is not the most

striking one. Probably I had supposed it was, for a long time, but did not recognize it and anticipate its importance until I had made a drawing of the end half of the abdomen of both species (fig. 1a, b). This striking character was at first not sufficiently noted in the erroneous supposition that it might depend on and vary in consequence of different degrees of extension of the abdominal segments in a longitudinal direction, and also with the thickness and volume of the whole abdomen as is the case in the more slender nymphs of *Aeschna* (cf. SCHMIDT, 1936, p. 55 f.). All other characters that are given in the literature fail, or are of lesser importance, as the following tables 1 and 2 will show.

TABLE 1. Characters of the Whole Body and Abdomen

No.	Character	*Som. arctica*	*Som. alpestris*	Result
1	Length of body	17–19 mm.	18.5–20.5 mm.	Overlapping
2	Shape of abdomen	Sides more parallel, blunt at the end	Fusiform, more acute at the end	Fundamental
3	Width of abdomen	6.2–7.0 mm.	6.5–7.5 mm.	Overlapping
4a	Length of caudal spines	0.8–1.3 mm.	1.0–1.3 mm.	Not satisfactory
4b	Length of segm. 10	0.3–0.5 mm.	0.3–0.5 mm.	Not satisfactory
4c	Relation 4a:4b	Mostly 1.0:0.4 = 2½	Mostly 1.3:0.4 = 3	Overlapping
5	Distribution of long hairs on abdomen (fig. 1a–d)	Longest on caudal border of segm. 6–9 and lateral of 8–9; long hairs also on nearly whole surface	Long hairs only on caudal border of segm. 6–9 and lateral of 8–9; very short hairs on other parts	Very useful
6	Patterns of abdomen (fig. 1a, b)	Naked paired spots of same color as surrounding parts on segm. 2–9	Dark naked paired spots on same segments as *S. arctica*	Doubtful and scarcely useful, only if skins are not bleached by the sun

Character 1 was obtained from 10 specimens; 3, 4 and 6 from five specimens of each species. The measurements of characters 1 and 3 were made by means of a simple ruler, those of 4a and 4b with the scale of a cross-table of my microscope, in the hope of avoiding an optical illusion. Character 2 was expressed in other terms than originally and should correspond more closely to actual conditions.

The following characters of the labium (mask) are all inconvenient since they are usually not visible from the outside on dry

skins without additional preparation (softening, etc.), and often the mask is covered by the antennae. Moreover, these characters are insufficient, as is shown by Table 2 which is compiled from 5 specimens of each species.

TABLE 2. Characters of the Labium (Mask)

No.	Character	*Som. arctica*	*Som. alpestris*	Result
7	Number of serrations on distal border	9–11, mostly 10	10–11, mostly 10	Not satisfactory
8	Number of spines on each serration	3–4–5	2–3–(4)	Overlapping
9	Number of labial setae	8–9, all equally common	7–9, mostly 8	Not satisfactory
10	Number of mental setae	9–13, mostly 12	13–14	Partly overlapping

The incisions on the distal border of the mask are deeper near the movable hook than on the base (lower part), and the number of spines (character 8) also varies and does not agree in any of the five specimens studied. Tables 3 and 4 show this variation.

Under these circumstances it seemed desirable to search for other characters that would be suitable for distinguishing the nymphs of these two species.

TABLE 3. Variation of Character No. 8 in *Som. arctica.*

Number of serration, counted from base	1	2	3	4	5	6	7	8	9	10
Maximum number of corresponding spines	14	4	5	5	5	5	3	3	2	1
Minimum number of corresponding spines	5	2	3	3	3	3	2	2	1	1
Most frequent number of spines	9	4	4	4	4	3	3	2	1–2	1

TABLE 4. Variation of Character No. 8 in *Som. alpestris.*

Number of serration, counted from base	1	2	3	4	5	6	7	8	9	10
Maximum number of corresponding spines	9	3	4	3	4	3	3	3	2	1
Minimum number of corresponding spines	2	2	2	3	3	2	2	2	1	—
Most frequent number of spines	2, 5, 6, 7	2, 3	3	3	3	3	3	2	1, 2	1

11. The first that I believed to be important in both males and females, was the *impression of the genitalia* on the inside of the skin, marks or prints that are visible on the outside if the surface is clean as is usually the case. In the male such marks appear on segm. 2, 3 and 9. Those on segm. 2 consist, in both *Somatochlora* species, of the inconspicuous lamina anterior (fig. 2d, e, *la*) and nearer the hind border is a pair of posterior hamules (*ha*); between the latter a median print is visible, probably the sheath of the penis (ligula). The third segment bears the impression of the penis that appears as a conspicuous, nearly circular vault with different but somewhat variable processes. The shape of the hamules and the color of the ligula give useful characters (see the key, below. The print of segm. 9 was not studied.

In the female, some prints are visible only on segm. 8 and 9. A pair of triangular tubercles between the two segments are most conspicuous, but the different characters are not very remarkable (fig. 2f-h).

12. But some weeks ago, I was astonished to discover quite another character, one that suggested the writing of this paper. It was the difference in the *distribution of the "triangular sclerites"* in the two species of *Somatochlora* (fig. 1c, d; see SCHMIDT, 1951, ENT. NEWS, pp. 125–134). The presence or absence of these sclerites, especially on abdominal segment 7, agreed completely with RIS' fundamental characters of the shape of abdomen and the arrangement of long hairs (characters 2 and 5). This character was compared on 73 exuviae of *S. arctica,* which has the sclerites on segm. 4–8, and on more than 80 of *S. alpestris,* where they are missing on segm. 7. In the latter species the triangular sclerites were mostly present also on segm. 8, except on one male and one female skin where they were absent. This character is easily visible with only a little enlarging if skins are clean, as is mostly the case.

13. The presence or absence of *divided setae,* however, at the distal end of fore tibia was difficult to see, apparently, in all *Somatochlora* nymphs; it seems that only very few such setae occur here, and not even regularly. These setae—I succeeded in finding not more than 3 setae in only one exuviae of *S. metallica*

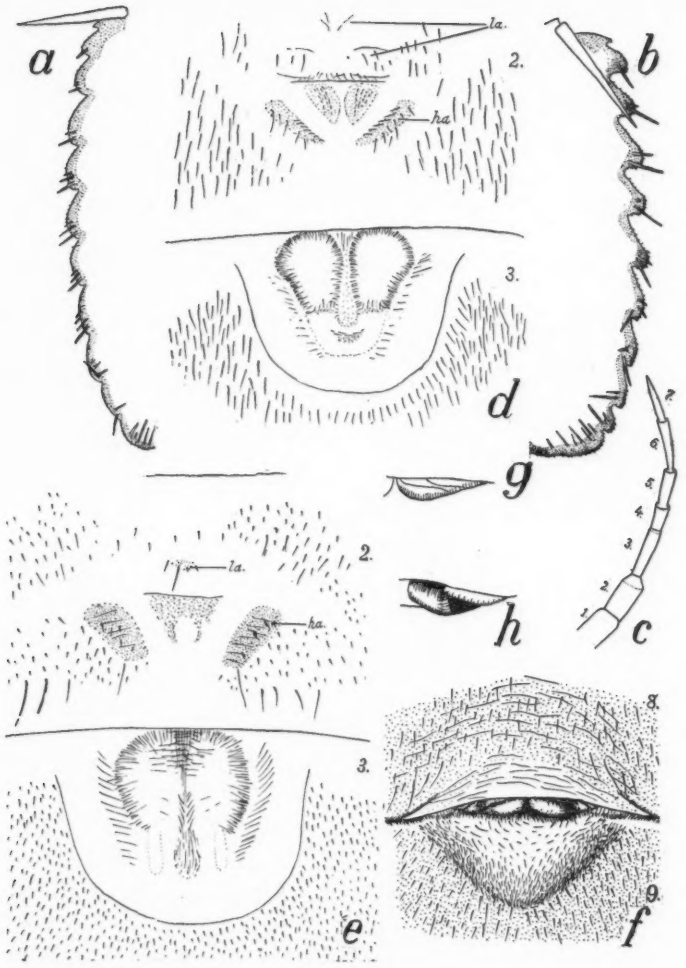

FIGURE 2

a, d, g *Somatochlora arctica* Zett.; b, c, e, f, h *S. alpestris* Selys; nymphal skins from the bog near Spiesshorn, Black Forest, 24.VI.39.

a, b distal border of labium with movable hook; c antenna; d, e prints of male genitalia on abd. segm. 2 and 3; *la* lamina anterior; *ha* posterior hamules; f print of female genitalia on abd. segm. 8–9; g, h left tubercle of female exuviae between segm. 8 and 9.

and another of *S. alpestris* among several skins studied of both species and of *S. arctica*—are restricted to a small heap on distal end of fore tibia, while other genera, such as *Epitheca, Cordulia* (see SCHMIDT, 1944, textfig. 3d) and the nymph described below, show a long row of such setae extending from the distal end of the tibia to the first two joints of the tarsi.

The result of these studies is the following key to the nymphs of both species, preceded by some characters that are common to them.

Both species have neither lateral nor dorsal spines on the abdomen. Legs moderately long. Antennae with 7 joints, the third and sixth being the longest (fig. 2c), while *S. metallica* and *S. flavomaculata* have only 3rd joint longest (as in fig. 3c). Very long hairs on caudal border of abdominal segments 6–9, and on lateral border of 8–9. Distal border of labial mask with 9–11 serrations, mostly 10, the incisions near movable hook deeper than the others; 7–9 labial setae on both sides.

A. Smaller and narrower on the average. Total length of body of exuviae 17–19 mm.; abdomen with more parallel sides, more blunt at the end (fig. 1a), its greatest width 6.2 – 7.0 mm. Long hairs on the greater part of surface of abdomen except on paired lateral spots on segm. 2–9, the long hairs present also on underside (fig. 1a, c). Triangular sclerites on segm. 4–8 (fig. 1c). 3–5, mostly 3–4, spines on middle serrations of distal border of labium (fig. 2a); mental setae 9–13, mostly 12. ♂: Between the dark, relatively narrow *imprints* of posterior hamules a dark, often paired, print of the ligula is visible; on segm. 3 the print of the penis with a median, caudal, transversely furrowed prolongation (fig. 2d). ♀: No vault on segm. 9; the two tubercles between segm. 8 and 9 less prominent, some oblique, but not deep grooves not very conspicuous (fig. 2g). . . . . *S. arctica*

B. Larger and broader on the average. Total length of body of exuviae 18.5 – 20.5 mm; abdomen more fusiform, somewhat acute at the end (fig. 1b), its greatest width 6.5 – 7.5 mm. No long hairs on abdominal surface (fig. 1b, d), except some borders of segments mentioned above. Triangular sclerites on segm. 4–6, mostly also on segm. 8, never on 7 (fig. 1d). 2–3 (rarely 4) spines on each serration of distal border of labial mask (fig. 2 b); mental setae 13–14 on each side. ♂: Between the dark, relatively wide paired prints of the posterior hamules

on abd. segm. 2 a light unpaired print is visible; print of penis on segm. 3 with one not always visible pair of caudal prolongations (fig. 2e). ♀: Segm. 9 with a slight vault near anterior border; tubercles between 8th and 9th segment bear an oblique deep groove (fig. 2f, h). .....*S. alpestris*

2. The Supposed Nymph of the Chilean *Paracordulia tomentosa* (Fabr.) *

In the Schönemann collection of Chilean insects purchased by the Zoological Museum of the University of Berlin a female exuviae is preserved with the label, "Cauquénes, Auf einem Baum, am Fluss . . . , sept. 1894." This nymphal skin has a total length of 24 mm., and, from its similarity to the well-known nymph of the European *Epithecia bimaculata,* it belongs probably to the subfamily Corduliinae.

There are, however, two Corduliine species known from Chile as imagoes, *Gomphomacromia paradoxa* Brauer and *Paracordulia tomentosa* (Fabr. = *villosa* Ramb. teste E. M. Walker, 1925, p. 16), both species being represented by imagoes also from Cauquénes. *Gomphomacromia paradoxa,* a common insect in Chile, with surely a most interesting but still unknown nymph, had an imaginal abdomen ca. 24–27 mm. in length; the other species, also not rare, is larger and its imaginal abdomen measures ca. 32 mm. Since the present nymphal skin is relatively large, we conclude that it belongs to the larger imago, that is, to *Paracordulia tomentosa* (Fabr.). We may suppose also that the hitherto unknown nymph of *Gomphomacromia paradoxa* will be found to have triangular sclerites on several segments of the abdomen.

The present nymphal skin is somewhat smaller than that of *Epitheca bimaculata* which measures ca. 28 mm. It has the two

* And now (five months after having submitted the manuscript for this paper) I have received from Argentina a reprint of the work by Needham and Bullock of 1943 entitled, "The Odonata of Chile," from the Zoological Series of the Field Museum of Natural History, Vol. 24, no. 32. Here, under the name *Anticordulia villosa* (Ramb.) there is described, very obviously, the same animal. The descriptions differ somewhat from each other since the two authors lay unequal stress upon the different characters.

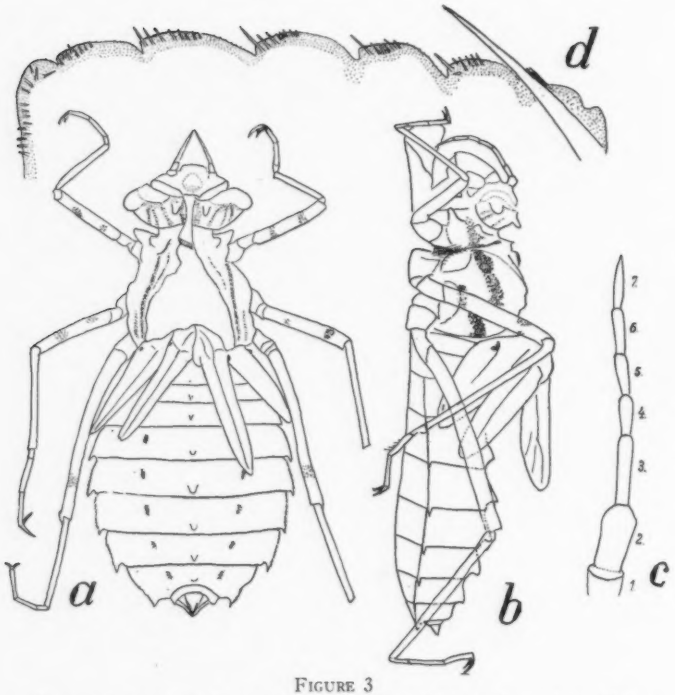

FIGURE 3

Supposed nymph of *Paracordulia tomentosa* (Fabr.), Cauquénes, Chile; female, Sept. 1894, leg. Schönemann.

a total dorsal view; b same, seen from left side; c antenna; d distal border of labial mask.

occipital processes (fig. 3a, b) of *Epitheca,* but they are larger. The head has a frontal border; the back edges are more rounded than in *Epitheca.* Lateral lobes of labial mask have only 7 serrations on each side (fig. 3d), not as deep as in *Epitheca,* each bearing 7 spines in the middle part of the row; mental and labial setae 7 on each side. Prothorax laterally with a conspicuous process which is directed laterally (not frontally, as in *Epitheca*), blunt and rounded behind. Antennae (fig. 3c) with 7 joints, the third being the longest (as in *Epitheca*). Lateral brown bands of thorax similar to those of *Epitheca* and *Cordulia.* At

base of each wing sheath a dark brown hump is present, as in *Epitheca*. Greatest width of abdomen 11 mm. (as in *Epitheca*); lateral abdominal spines present on segm. 5–9 (fig. 3a) (in *Epitheca* only on 8 and 9, but much larger), increasing slightly in size towards the end of abdomen; dorsal spines on segm. 3–9 (fig. 3b), those on 4–8 large but blunt (in *Epitheca* segm. 2–9 with very acute dorsal spines); segm. 4–8 (–9) each with a pair of lateral longitudinal brown spots of half of length of one segment, situated near middle between dorsal and lateral spines; ventral side without triangular sclerites (as in *Epitheca*); in median line of caudal end of 8th sternite two small trigonal tubercles are visible, the rudiments of female genital processes; on segm. 6, lateral from the spiracle near anterior border of the segment, a conspicuous transverse groove corresponds to an interior apodeme (as in *Epitheca*). Legs long, femora 1–2 with two not very conspicuous darker bands on upper side; distal end of tibia and first and second joints of tarsi of fore legs on underside with numerous divided setae in a longitudinal row (in *Epitheca*, same on all legs!). Hind femora 9 mm. long, with only one dark apical band.

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Notes on the Genus Aterpia Gn. (= Esia Heinr.) (Lepidoptera, Tortricidae) *

By Nicholas Obraztsov, Munich, Germany

The genus *Esia* Heinr. was described by Heinrich (1926) with the Nearctic species *approximana* (Heinr.) as genotypus. As additional species of this genus, Heinrich named two Palearctic species, *charpentierana* (Hb.) and *spuriana* (HS.). My studies on the Palearctic Tortricidae have convinced me of the correctness of Heinrich's classification and I have established that one more species also belongs to the same genus. This is *sieversiana* (Nolck.). In this way the genus *Esia* consists of a single Nearctic and three Palearctic species. The present paper is occupied with the nomenclature of the genus and with that of the species which is usually known as *charpentierana* (Hb.) and brings a list of Holarctic species including their synonymy.

Guenée has published a genus which he named *Aterpia* Gn. This genus was established for *anderreggana* Gn. and was stated to be monotypic. The species of Guenée is, according to Joannis (Ann. Soc. Ent. France 88, 1919, p. 9), an old name for *spuriana* (HS.). As this species is congeneric with *approximana* (Heinr.), there is no doubt that *Esia* Heinr. 1926 is a subjective synonym of *Aterpia* Gn. 1845. On the strength of priority, the latter name must be used instead of *Esia* Heinr.

The specific name *charpentierana* (Hb. 1822) is not the oldest of the species which is usually known under this name. According to Herrich-Schäffer (Syst. Bearb. Schm. Eur. 4, 1851, p. 218) *charpentierana* is the same species which Fischer v. Röslerstamm found in the collection of Schiffermiller under the name of *corticana* (Schiff. 1776). The original description of *corticana* does not contradict this evidence and is as follows: "Dunkelgrau und weißgefleckter W.[ickler]." Charpentier (Zinsler, Wickler etc., 1821, p. 85), who saw also the types of

* Contribution from the Zoological Collection of the Bavarian State, Division of Entomology.

corticana in the collection mentioned earlier than Fischer v. Röslerstamm, compared those with *Argyroploce schulziana* (F.) = *pinetana* (Hb.) and found them smaller and more brownish gray than *schueziana*. Werneburg (Beitr. Schm.-Kunde 1, 1864, p. 554) did not doubt that Charpentier and Fischer v. Röslerstamm saw the same original specimens of *corticana* (Schiff.) in the collection of Schiffermiller.

It is no fortuity that Hübner (1822–23) named this species *charpentierana* as he considered the view of Charpentier to be erroneous and, I suppose, he intended in this way to point out the merit of Charpentier as discoverer of a new species. Hübner conceived as *corticana* two other species, but we have no proof that he was familiar with all the original specimens of *corticana* in Schiffermiller's collection. If he had seen them he would have been probably not so uncertain in the determination of this species! Hübner (Samml. eur. Schm., Tortr., 1796–99, t. 3, fig. 13) designated as *corticana* first of all the species which is known at present as *Apotomis turbidana* Hb. He himself later perceived this error and replaced the erroneous name of *corticana* (Hb., non Schiff.) by that of *turbidana* (Hübner, Verz. bek. Schm., 1825, p. 380). Hübner (Samml. eur. Schm., Tortr., 1811–13, t. 33, fig. 209; 1818–19, t. 43, fig. 270) has moreover designated as *corticana* another species, i.e., the modern *Zeiraphera isertana* (F.). Soon he changed this name to *kuhlweiniana* (Hübner, 1825, p. 377) and made use of *corticana* Hb. only for designation of Hb. fig. 270. Compared with the original description of *corticana* (Schiff.) this figure is not the species mentioned.

In this way the deposition of Fischer v. Röslerstamm is a single perceptible one and I will agree with Herrich-Schäffer (l.c.): *corticana* (Schiff.) = *charpentierana* (Hb.).

List of the Holarctic Species of the Genus Aterpia Gn.

Genus **Aterpia** Gn. 1845

Aterpia Guenée, Ann. Soc. Ent. France (2) 3, 1845, p. 161.—Genotype: *Aterpia anderreggana* Gn. 1845.

Olethreutes (part.) Heinrich, Ins. Ins. Mens. 7, 1919, p. 65.

Esia Heinrich, U. S. Nat. Mus., Bull. 132, 1926, p. 109.—Genotype: *Olethreutes approximana* Heinr. 1919.

Nearctic species

approximana (Heinr.).

approximana Heinrich, Ins. Ins. Mens. 7, 1919, p. 65 (Olethreutes).—Canada m.; U.S.A. s.or.

Palearctic species

corticana (Schiff.).

corticana Schiffermiller, Syst. Verz. Schm. Wien. Geg., 1776, p. 131 (Phalaena); *charpentierana* Hübner [Samml. eur. Schm., Tortr., 1822–23, t. 45, fig. 281; non bin.], Syst.-alph. Verz., 1822, p. 59 (Olethreutes); ? *interruptana* Frölich, Enum. Tortr. Würt., 1828, p. 70 (Tortrix); ? *bipunctana* (part.) Lederer, Wien. Ent. Monatschr. 3, 1859, p. 287 (Penthina).—Europa c.; Gallia m.; Balticum or.; Rossia s.oc.

sieversiana (Nolck.).

sieversiana Nolcken, Arb. Naturf.-Ver. Riga, 1870, p. 407 (Penthina).—Suecia; Balticum or.; Bavaria m.; Sibiria m.or.

anderreggana Gn.

anderreggana Guenée, Ann. Soc. Ent. France (2) 3, 1845, p. 161 (Aterpia); *spuriana* Herrich-Schäffer, Syst. Bearb. Schm. Eur. 4 [Tortr., 1849, t. 47, fig. 334; non bin.], 1851, p. 211 (Sericoris); *andereggiana* Kennel, Pal. Tortr., 1913, t. 16, fig. 41–42 (Argyroploce; nom. emend.); *andereggana* Joannis, Ann. Soc. Ent. France 88, 1919, p. 9 (Aterpia; non. emend.).—Alpes Europae c.

ab. *rebeliana* Mitterberger, Soc. Ent. 27, 1912, p. 19 (Olethreutes).

Notice of Proposed Suspension of the Rules of Zoological Nomenclature

Applications to be published in Bull. Zool. Nomencl., Vol. 2, pt. 11, include: *Nysius* Dallas, 1852 and *Artheneis* Spinola, 1837 (File 181). In Vol. 6, pt. 2: *Laternaria* Linnaeus, 1764, proposed suppression of, and validation of *Fulgora* Linnaeus, 1767 (File 162). *Geotrupes* Latreille, 1796 (File 338). *Lipeurus, Colpocephalum, Gyropus,* all of Nitzsch, 1818 (File 343).

Specialists that desire to comment on these applications please write to Francis Hemming, 28 Park Village East, Regent's Park, London N. W. 1, England before March 28, 1952, giving the file number.

Current Entomological Literature

COMPILED BY R. G. SCHMIEDER

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia and the University of Pennsylvania, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the year 1951 unless otherwise noted. Continued papers, with few exceptions, are recorded only at their first installment.

For other records of general literature and for economic literature, see the Bibliography of Agriculture, Washington, and the Review of Applied Entomology, Series A, London. For records of papers on medical entomology see Review of Applied Entomology, Series B.

NOTE: The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the List of periodicals and serials published in our January and June issues. The number of the volume, and in some cases, the part, heft, &c. is followed by a colon (:). References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to Neotropical species, and not so indicated in the title, have the symbol (S).

Papers published in ENTOMOLOGICAL NEWS are not listed.

GENERAL—Arcangeli, A.—Teoria sulla origine del gonocorismo dall'ermafroditismo primario e sulla origine dal gonocorismo della partenogenesi, dell'ermafroditismo secondario e della intersessualità. [Boll. Ist. e Mus. Zool. Torino] 2 (1949–50): 237–557. **Bartlett, B. R.**—A new method for rearing Drosophila and a technique for testing insecticides with this insect. [37] 44: 621. **Carvalhaes, J.**—Significado ecológico do mimetismo nos insectos. 4. [Broteria] 20: 64–65. **Chauvin, R.**—Méthodes de mesures physiques et méthodes de prélèvement en écologie entomologique. [L'Année Biol.] 27: 313–23. **DeBacker, S.**—Techniques d'étude des microclimats en écologie terrestre. [L'Année Biol.] 27: 297–308. **Dobzhansky, T. and H. Levene**—Development of heterosis through natural selection in experimental populations of Drosophila pseudoobscura. [3] 85: 247–64. **Dominicis, A. de**—In memoria di Filippo Silvestri. [Ann. Fac. Agr. Portici] 17: I–XVII (Obit. and portr.), 1948–49. **Franz, H.**—État de nos connaissance sur la microfaune du sol. [L'Année Biol.] 27: 241–54. **Hassall, A., M. A. Doss and J. M. Humphrey**—Index-catologue of medical and veterinary zoology. Part 14, authors S to Schweig., pp. 4349–4676. U. S. Dept. Agr., $1.25. **Hodgden, B. B.**—Some entomological aspects of a flood emergency. [52] 11: 94–95. **Huffaker, C. B.**—The return of native perennial bunchgrass following the removal of Klamath weed (Hypericum perforatum L.) by imported beetles. [26] 32: 443–58. **Kettle, D. S.**—Some factors affecting the population density and flight range of insects. [68] 26: 59–63. **Ludwin, I.**—Natural selection in Drosoph-

ila melanogaster under laboratory conditions. [100] 5: 231–42. **Marcuzzi, G.**—Notas preliminares sobre la fauna y flora de la Isla de Margarita. [Mem. Soc. Cien. Nat. La Salle] 10: 207–56, 1950. **Masi, L.**—Filippo Silvestri. [Mem. Soc. Ent. Ital.] 29: 125–35 (Obit., portrait), 1950. **McAtee, W. L. and J. S. Wade**—Raymond Corbett Shannon, 1894–1945. [65] 53: 211–22 (Biographical sketch and bibliography). **Muesebeck, C. F. W., A. B. Gahan and E. R. Sasscer**—Sievert Allen Rohwer, 1888–1951. [65] 53: 227–30 (Obit., portrait). **Paclt, J.**—Concerning orthography of scientific names. [80] 114: 63–64. **Pavan, M.**—Ricerche sperimentali sul comportamento degli artropodi. I. Apparecchio per lo studio delle tassie. [Boll. Soc. Ent. Ital.] 80: 27–32, ill., 1950. **Piemeisel, R. L., F. R. Lawson and E. Carsner**—Weeds, insects, plant diseases, and dust storms. [81] 73: 124–28. **Polivka, J. B.**—Effect of insecticides upon earthworm population. [58] 51: 194–96. **Renden, J. M.**—Mating of ebony vestigial and wild type Drosophila melanogaster in light and dark. [100] 5: 226–30. **Ripper, W. E., R. M. Greenslade and G. S. Hartley**—Selective insecticides and biological control. [37] 44: 448–59. **Schneirla, T. C.**—Bees (A review of: Bees—their vision, chemical senses, and language by Karl von Frisch). [26] 32: 562–65. **Shenefelt, R. D. and J. T. Medler**—Should a "Law of Recency" be added to the International Code of Zoological Nomenclature? [80] 114: 154–46. **Skerrett, E. J., A. Stringer and D. Woodcock**—The insecticidal action of DDT. [Biochem. Jour.] 49 (2): Proc. Biochem. Soc., pp. xxviii–xxix. **Snodgrass, R. E.**—Anatomy and morphology. [45] 59: 71–73. **Springer, P. F. and J. R. Webster**—Biological effects of DDT applications on tidal salt marshes. [52] 11: 67–74. **Stanley, J.**—The autotrephon: an apparatus for rearing insects under controlled conditions with automatic time-controlled withdrawal of samples. [26] 32: 413–442, ill. **Sudia, W. D.**—A device for rearing animals requiring a flowing water environment. [58] 51: 197–202. **Thomas, E. S.**—Distribution of Ohio animals. [58] 51: 153–67. **Tilden, J. W.**—The insect associates of Baccharis pilularis de Cand. [50] 16: 149–88. **Ullyett, G. C.**—Insects, man and the environment. [37] 44: 459–64. **Weiss, H. B.**—Rodrigues Ottolengui, 1861–1937. [45] 59: 93–98.

ANATOMY, PHYSIOLOGY, MEDICAL—Agrell, I.—The diapause problem. [L'Année Biol.] 27: 287–95. **Ball, H. J. and S. D. Beck**—The role of the circulatory and

nervous systems in the toxic action of parathion. [37] 44: 558–64. **Barr, A. R. and L. Kartman**—Biometrical notes on the hybridization of Culex pipiens L. and C. quinquefasciatus Say. [46] 37: 419–20. **Berio, E.**—Descrizione dell'articolazione dell'addome sul torace nei Chrysididi (Hym.). [Mem. Soc. Ent. Ital.] 29: 112–16, 1950. **Blower, G.**—A comparative study of the Chilopod and Diplopod cuticle. [74] 92: 141–61. **Bonhag, P. F.**—The skeleto-muscular mechanism of the head and abdomen of the adult horsefly (Diptera: Tabanidae). [83] 77: 131–202, ill. **Brunet, P. C. J.**—The formation of the ootheca by Periplaneta americana. I. The micro-anatomy and histology of the posterior part of the abdomen. [74] 92: 113–27. **Buchli, H.**—Les potentialités évolutives des castes chez Reticulitermes de Saintonge. [C. R. Acad. Sci.] 233: 206–08. **Burtt, E.**—The ability of adult grasshoppers to change color on burnt ground. [68] 26: 45–48, ill. The occurrence of fully winged forms in usually brachypterous African Pyrgomorphinae. *Ibid.* 64–66, ill. **Caspers, H.**—Rhythmische Erscheinungen in der Fortpflanzung von Clunio marinus (Dipt., Chiron.) und das Problem der lunaren Periodizität bei Organismen. [Arch. Hydrobiol.] Suppl. Bd. 18: 415–594, ill. **Dunn, E.**—Wing coloration as a means of determining the age of the Colorado potato beetle (Leptinotarsa decemlineata Say). [4] 38: 433–34, ill. **Elkins, J. C.**—Head capsule of the Hemipteran, Triatoma sanguisuga (LeC.). [Field and Lab., Dallas] 19: 128–32. **Ehrlich, I.**—Ueber das verhalten der Geschlechtschromosomen von Acanthaclisis occitanica Vill. (Neuroptera) während der meiotischen Prophase. [Glasnik Biol. Sek., Zagreb] 2/3: 168–69, 1950. **Gambaro, P.**—Lo stadio ibernante dell'Aspidiotus perniciosus Comst. [Atti Ist. Venet. Sci. Lett. Art. Cl. Sci. mat. e nat.] 108: 139–43. **Geigy, R. und E. Ernst**—Einfluss der Luftfeuchtigkeit auf die Lebensdauer verschiedener Termitenarten im Hungerversuch. [Rev. Suisse Zool.] 58: 414–20. **Geigy, R. und U. Rahm**—Beiträge zur experimentellen Analyse der Metamorphose von Sialis lutaria L. (Megaloptera). [Rev. Suisse Zool.] 58: 408–13. **Geiszler, G.**—Keimzellenstudien. II. Das Verhalten der Plasmakomponenten während der Spermatogenese bei Insekten (Chrysochraon dispar (Orth.) und Notonecta glauca (Rhynch.). [Zeitschr. wiss. Zool.] 156: 200–58, 1944. **Goldschmidt, R. B.**—The maternal effect in the production of the Bd-M-intersexes in Drosophila melanogaster. [41] 117: 75–110. **Grandori, R. e L., D.**

Facetti—Effetti tossici selettivi della carbacolina su alcune specie di insetti. [Boll. Zool. Agr. Bach.] 17: 123–28. **Grandori, R. e L., Carè, E.**—Sulla presenza di cellule giganti nel sistema nervoso centrale di Musca domestica L. [Boll. Zool. Agr. Bach.] 17: 93–99, ill. **Green, A. A.**—The control of blowflies infesting slaughter houses. I. Field observations of the habits of blowflies. [4] 38: 475–94. **Hackman, R. H.**—The chemical composition of the wax of the white wax scale, Ceroplastes destructor (Newstead). [Arch. Biochem. Biophys.] 33: 150–54. **Haget, A.**—Quelque précisions sur le phénomène d'induction dans la morphogenèse de l'intestin moyen chez l'embryon de Leptinotarsa (Coleop.). [C. R. Acad. Sci.] 232: 2480–82. **Hassanein, M. H.**—Studies on the effect of infection with Nosema apis on the physiology of the queen honey-bee. [74] 92: 225–31. **Hassett, C. C. and D. W. Jenkins**—The uptake and effect of radiophosphorus on mosquitoes. [Physiol. Zool.] 24: 249–66. **Hoffman, R. A. and A. W. Lindquist**—Studies on treatment of flies with radioactive phosphorus. [37] 44: 471–73. **Jones, B. M.**—The sensory physiology of the harvest mite Trombicula autumnalis Shaw. [40] 27: 461. **Katô, M. and M. Toriumi**—Studies on the associative ecology of insects. III. Nocturnal activity of Culex tritaeniorhynchus Giles and Anopheles hyrcanus sinensis Wied. [Sci. Rpts., Tôhoku] ser. 4, 19: 1–6. **La Greca, M.**—L'evoluzione delle pleure pterotoraciche degli insetti Blattotteroidi. [Boll. Zool., Torino] 16: 119–29, ill., 1949. **Lawson, F. A.**—Structural features of the oothecae of certain species of cockroaches. [5] 44: 269–85, ill. **Lerma, B. de**—Sulla presenza di cellule giganti nel cerebron e nella massa gangliare sottoesofagea dei Coleotteri. [Boll. Zool., Torino] 16: 169–77, 1949. **Levenbook, L.**—The variation in fat and glycogen content of bot fly (Gatrophilus intestinalis) larva tracheal organ during development. [40] 28: 173–80. The effect of carbon dioxide and certain respiratory inhibitors on the respiration of larvae of the horse bot fly. (G. intest.). *Ibid.* 221–45. **Lüdtke, H.**—Ueber retinomotorische Erscheinungen im Insektenauge. [Naturwiss.] 38: 285–87. **Lüscher, M.**—Ueber die Determination der Ersatzgeschlechtstiere bei der Termite Kalotermes flavicollis Fabr. [Rev. Suisse Zool.] 58: 404–08. **Mercier-Parot, M.**—Action de la température sur la transmission par les Drosophiles femelles de la sensibilité héréditaire au gaz carbonique. [Bull. Biol. Fr. Belg.] 85: 226–36. **Meyer,**

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the dried fruit beetle Carpophilus hemipterus. [Biochem. Jour.] 49 (2): Proc. Biochem. Soc., p. xxvi. **Takaoka, M.**—Studies on the metamorphosis of insects. I. Partial puparium formation in Drosophila melanogaster. [Sci. Rpts., Tohôku] ser. 4, 19: 88–90. **Umeya, Y.**—Studies on embryonic hibernation and diapause in insects. [Proc. Japan Acad.] 26: 1–9. **Urbani, E.**—Studio comparativo della massa di Giardina nei Dytiscidae. [Lincei Rend. Sc. fis. mat. e nat.] 9: 384–89, ill., 1950. **Vachon, M.**—Les glandes des chélicères des Pseudoscorpios (Arachnides). [C. R. Acad. Sci.] 233: 205–06. **Voy, A.**—Étude de la croissance chez deux espèces d'Orthoptéroides: Blatta orientalis L. (Blattidae), Carausius morosus Br. (Phasmidae). [Bull. Biol. Fr. Belg.] 85: 237–65. Croissance régénétrice au cours des cinq ages de la phase larvaire chez phasme (Carausius morosus Br.). [C. R. Acad. Sci.] 233: 209–11. **White, M. J. D. and N. H. Nickerson**—Structural heterozygosity in a very rare species of grasshopper. [3] 85: 239–46, ill. **Wiesmann, R.**—Ueber einen biologischen Test zum Nachweis und zur Bestimmung von synthetischen Kontacktinsektiziden bei Bienenvergiftungen. [Zeitschr. Pflanzenkr. (Pflanzenpath.) Pflanzenschutz.] 58: 161–71. **Wykes, G. R.**—The preferences shown by honey-bees for certain nectars. [4] 38: 546.

ARACHNIDA AND MYRIOPODA—Blower, G.—(See under Anatomy.) **Camargo, H. F. deA.**—Contribuição ao estudo das Aranhas Brasilieras (Araneae). [Papeis Avulsos] 9: 223–48 (*). **Jones, B. M.**—(See under Anatomy.) **Lipovsky, L. J.**—A new genus of Walchiinae (Acarina, Tromb.). [43] 24: 95–102, ill. **Mello-Leitão, C. de**—Famílias, subfamília, espécies e gêneros novos de Opiliões e notas de sinonimia. [Bol. Mus. Nac. n.s. Zooi.] No. 94: 1–33, ill., 1949. **Monterosso, B.**—(See under Anatomy.) **Panouse, J.-B.**—Sur la systematique des Solifuges. [Bull. Mus. Nat. d'Hist. Nat.] 22: 717–22. **Ronsisvalle, C.**—(See under Anatomy.) **Schubart, O.**—Novos Diplópodos do Brasil. [Papeis Avulsos] 9: 145–57, ill. **Schulze, P.**—(See under Anatomy.) **Soares, B. A. M. e H. E. M.**—Alguns opiliões do sul do Brasil. [Papeis Avulsos] 9: 47–60. **Vachon, M.**—A propos d'une association phoretique: Coleoptere-Acariens-Pseudoscorpions. [Bull. Mus. Nat. d'Hist. Nat.] 22: 728–33. (See also under Anatomy.)

SMALLER ORDERS—Barnhart, C. S.—A new silverfish of economic importance found in the United States

(Thysanura). [58] 51: 184–86, ill. **Bick, G. H.**—Notes on Oklahoma dragonflies. [47] 26: 178–80. **Buchli, H.**—Termites. (See under Anatomy.) **Despax, R.**—Plécoptères. [Faune de France] 55: 1–280, ill. **Geigy and Ernst**—Termites. (See under Anatomy.) **Guimarães, L. R.**—Sobre uma nova espécie de Pterophthirius Ewing 1923 (Anoplura). [Papeis Avulsos] 9: 83–88, ill. Sobre alguns gêneros e espécies de Heptapsogastridae (Mallophaga). *Ibid.* 249–58, ill. Pequenas notas sobre Melafagos. II. *Ibid.* 321–40, ill. **Harwell, J. E.**—Notes on the Odonata of northeast Texas. [Texas Jl. Sci.] 3: 204–07. **Kimmins, D. E.**—New species of Neuroptera from the Solomon Islands. [6] ser. 12, 4: 780–85. **Lüscher, M.**—Termites. (See under Anatomy.) **Penn, G. H.**—Seasonal variation in the adult size of Pachydiplax longipennis (Burmeister). (Odonata.) [5] 44: 193–97. **Risler, H.**—Mallophaga. (See under Anatomy.) **Salmon, J. T.**—Keys and bibliography to the Collembola. [Zool. Publ. Victoria Univ. College] No. 8: 1–82. **Traub, R. and V. J. Tipton**—Jordanopsylla allredi, a new genus and species of flea from Utah (Siphonaptera). [48] 41: 264–70, ill. **Ulmer, G.**—Köcherfliegen (Trichoptera) von den Sunda-Inseln (Teil I). [Arch. Hydrobiol.] Suppl. Bd. 19: 1–328, ill.

ORTHOPTERA—Anon.—The cockroach. Its life history and how to deal with it. [Brit. Mus. (Nat. Hist.) Econ. Ser.] No. 12, 1–26. **Brunet, P. C. J.**—(See under Anatomy.) **Gurney, A. B.**—The names of the field and house crickets. [37] 44: 611. **Hageman, D. C.**—Notes on the distribution and habits of two species of Arphia (Acrid.) that occur in New York and New Jersey. [45] 59: 111–14. **LaGreca, M.**—(See under Anatomy.) **Lawson, F. A.**—Oothecae. (See under Anatomy.) **Strohecker, H. F.**—Three new species of North American Orthoptera. [5] 44: 169–72, ill. **Thomas, E. S.**—Orchelimum. (See under General.) **Voy, A.**—(See under Anatomy.) **Wilkins, O. P. and O. P. Breland**—Notes on the great walking stick, Megaphasma denticrus (Stal). [Texas Jl. Sci.] 3: 305–10. **White and Nickerson**—(See under Anatomy.)

HEMIPTERA—Beamer, R. H.—A new genus and two new species of Delphacine Fulgorids. [5] 44: 198–200. A review of the genus Kelsia in America north of Mexico with four new species (Fulgoridae). [43] 24: 117–21, ill. **Beirne, B. P.**—The nearctic species of Oncopsis (Cicadell.). [23] 83: 185–94. **Carvalho, J. C. M. and W. E. China**—

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Reviews

A Monograph of the Collembola or Springtail Insects of New York State. By Elliot A. Maynard. Comstock Publishing Co., Inc., Ithaca, N. Y. Pp. xxii, 339, 37 pls. Price $7.50.

It is always satisfying to note the publication of a competent monographic work on a generally neglected group of insects. It is the fate of small forms that they are often overlooked in collecting and by-passed in identification. It may therefore be a surprise to some readers that the author of this book has here recorded from New York state 200 species and forms of this small order. Fifty-seven of these are new to science, as are also four of the genera.

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As its name implies, this book is concerned with insect control. It is extremely complete, investigating such subjects as the structure of organic chemicals, susceptibility of insects to poisons, equipment, application of insecticides, toxicity and hazards to man and other animals, and related subjects. Especially interesting are the chapters relating to specific controls for specific insects. Each chapter has an extended bibliography.

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